

Provide a means for a Control and Test Unit for a Squib Driver circuit, containing a Firing Control (FC) unit and a Diagnostic and Online Test (DOT) unit with input and output connections for - interalia - an electrical Safing Sensor, a Fuel Cut-Off During Collision operation and a Diagnostic Lamp Driver signal, and further additionally containing measuring or sensing input signals and control output signals
Provide for said Squib Driver circuit means for connecting an external main power supply via a mechanical Safing Sensor and means for connecting to ground
$\downarrow$
Provide for said Squib Driver circuit external means for said power supply using a single charge pump circuit for storing said main supply energy within an external storage capacitor as AVS voltage
$\downarrow$
Provide for said Squib Driver circuit connection means for connecting an external igniter device or squib to a first connection pin named high-side connection and to a second connection pin named low-side connection
Provide a first internal means for switching operations of said external igniter device or squib on its high-side connection point, named high-side switching device
Provide a second internal means for switching operations of said external igniter device or squib on its low-side connection point, named low-side switching device
$\downarrow$

FIG. 3A

$\widehat{A}$
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Provide a first internal means for driving said internal high-side switching device, named High-Side Driver (HSD) circuit
Provide other internal means for supplying multiple driver currents to said internal low-side switching device using controllable and switchable current source circuits
Provide means for connection of said measuring or sensing input signals from said high-side and low-side switching devices to said Control and Test Unit
Provide means for connection of said control output signals from said Control and Test Unit to said controllable and switchable current source circuits for said low-side switching device
Implement said high-side switching device as a single NMOS FET switch transistor
Implement said low-side switching device with the help of a pair of NMOS transistors in current mirror configuration
Implement said high-side switch driver circuit with the help of an integrated HSD circuit, consisting of two anti-phased driven current mirror differential switching amplifier NMOS&PMOS stages each with PMOS output booster circuit and both driving one PMOS output driver stage biased by an internal current source
$\stackrel{\downarrow}{B}$

FIG. 3B

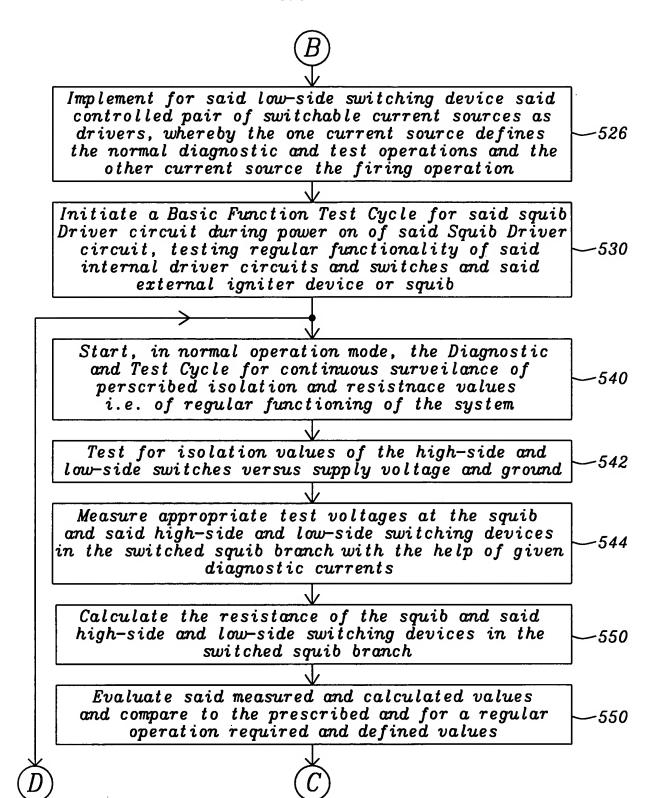


FIG. 3C

Activate in case of failure an alarming signal - 560 Calculate with the help of said voltage and resistance values secure firing current values for said high-side and low-side switching devices, thus trimming, i.e. setting-up said controlled - 570 driving currents to their operational necessary minimum, and thus limiting said main supply energy stored within said external storage capacitor to an optimum Continue cycling the Diagnostic and Test Cycle from its starting point above during normal - 580 operation of the Squib Driver circuit Fire the squib in case of emergency by switching on, both the high-side and the low-side switching devices at the same time and whilst observing - 590 given current limitations with the help of said controlled driving currents

FIG. 3D